The College of Agricultural, Consumer and Environmental Sciences is an engine for economic and community development in New Mexico, improving the lives of New Mexicans through academic, research, and extension programs.
Table 1. Chile Cultivars Developed at New Mexico State University and Their Pod Type, Average Heat Level, and Year of Official Release

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Pod Type</th>
<th>Heat Level (SHU)*</th>
<th>Year Released</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Mexico No. 9</td>
<td>New Mexican</td>
<td>1,000–1,500</td>
<td>1913</td>
</tr>
<tr>
<td>New Mexico No. 6</td>
<td>New Mexican</td>
<td>700–900</td>
<td>1950</td>
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<td>Sandia</td>
<td>New Mexican</td>
<td>1,500–2,000</td>
<td>1956</td>
</tr>
<tr>
<td>New Mexico 6-4</td>
<td>New Mexican</td>
<td>300–500</td>
<td>1957</td>
</tr>
<tr>
<td>Rio Grande 21</td>
<td>New Mexican</td>
<td>500–700</td>
<td>1967</td>
</tr>
<tr>
<td>NuMex Big Jim</td>
<td>New Mexican</td>
<td>500–2,000</td>
<td>1975</td>
</tr>
<tr>
<td>Española Improved</td>
<td>New Mexican</td>
<td>1,500–2,000</td>
<td>1984</td>
</tr>
<tr>
<td>NuMex R Naky</td>
<td>New Mexican</td>
<td>260–760</td>
<td>1985</td>
</tr>
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<td>NuMex Sunrise</td>
<td>New Mexican</td>
<td>300–500</td>
<td>1988</td>
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<td>New Mexican</td>
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<td>1988</td>
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</tr>
<tr>
<td>NuMex Joe E. Parker</td>
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<td>NuMex Heritage 6-4</td>
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<td>1,500</td>
<td>2008</td>
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<tr>
<td>NuMex Sandia Select</td>
<td>New Mexican</td>
<td>9,500</td>
<td>2014</td>
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<tr>
<td>NuMex R. Vince Hernandez</td>
<td>New Mexican</td>
<td>700</td>
<td>2015</td>
</tr>
<tr>
<td>NuMex Vaquero</td>
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<td>1997</td>
</tr>
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<td>2015</td>
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<td>NuMex Pumpkin Spice</td>
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<td>25,000</td>
<td>2015</td>
</tr>
<tr>
<td>NuMex Sunburst</td>
<td>de Arbol</td>
<td>**</td>
<td>1991</td>
</tr>
<tr>
<td>NuMex Sunflare</td>
<td>de Arbol</td>
<td>**</td>
<td>1991</td>
</tr>
<tr>
<td>NuMex Sunglo</td>
<td>de Arbol</td>
<td>**</td>
<td>1991</td>
</tr>
<tr>
<td>NuMex Bailey Piquin</td>
<td>Piquin</td>
<td>90,000–100,000</td>
<td>1991</td>
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<td>NuMex Centennial</td>
<td>Ornamental</td>
<td>**</td>
<td>1988</td>
</tr>
<tr>
<td>NuMex Twilight</td>
<td>Ornamental</td>
<td>**</td>
<td>1993</td>
</tr>
<tr>
<td>NuMex April Fool's Day</td>
<td>Ornamental</td>
<td>**</td>
<td>2010</td>
</tr>
<tr>
<td>NuMex Chinese New Year</td>
<td>Ornamental</td>
<td>**</td>
<td>2010</td>
</tr>
<tr>
<td>NuMex Christmas</td>
<td>Ornamental</td>
<td>**</td>
<td>2007</td>
</tr>
<tr>
<td>NuMex Cinco de Mayo</td>
<td>Ornamental</td>
<td>**</td>
<td>2010</td>
</tr>
<tr>
<td>NuMex Columbus Day</td>
<td>Ornamental</td>
<td>**</td>
<td>2016</td>
</tr>
<tr>
<td>NuMex Earth Day</td>
<td>Ornamental</td>
<td>**</td>
<td>2013</td>
</tr>
<tr>
<td>NuMex Easter</td>
<td>Ornamental</td>
<td>**</td>
<td>2010</td>
</tr>
<tr>
<td>NuMex Halloween</td>
<td>Ornamental</td>
<td>**</td>
<td>2007</td>
</tr>
<tr>
<td>NuMex Memorial Day</td>
<td>Ornamental</td>
<td>**</td>
<td>2007</td>
</tr>
<tr>
<td>NuMex St. Patrick's Day</td>
<td>Ornamental</td>
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<td>2007</td>
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Table 1. Chile Cultivars Developed at New Mexico State University and Their Pod Type, Average Heat Level, and Year of Official Release (cont.)

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Pod Type</th>
<th>Heat Level (SHU)*</th>
<th>Year Released</th>
</tr>
</thead>
<tbody>
<tr>
<td>NuMex Summer Solstice</td>
<td>Ornamental</td>
<td>**</td>
<td>2014</td>
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<tr>
<td>NuMex Thanksgiving</td>
<td>Ornamental</td>
<td>**</td>
<td>2007</td>
</tr>
<tr>
<td>NuMex Valentine’s Day</td>
<td>Ornamental</td>
<td>**</td>
<td>2007</td>
</tr>
<tr>
<td>NuMex Veterans Day</td>
<td>Ornamental</td>
<td>**</td>
<td>2014</td>
</tr>
<tr>
<td>NuMex Mirasol</td>
<td>Mirasol</td>
<td>**</td>
<td>1994</td>
</tr>
<tr>
<td>NuMex Nematador</td>
<td>Cayenne</td>
<td>15,000</td>
<td>2003</td>
</tr>
<tr>
<td>NuMex Las Cruces</td>
<td>Cayenne</td>
<td>17,400</td>
<td>2010</td>
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<tr>
<td>NuMex Suave Red</td>
<td>Habanero</td>
<td>774</td>
<td>2004</td>
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<tr>
<td>NuMex Suave Orange</td>
<td>Habanero</td>
<td>335</td>
<td>2004</td>
</tr>
<tr>
<td>NuMex Trick-or-Treat</td>
<td>Habanero</td>
<td>0</td>
<td>2015</td>
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* SHU = Scoville Heat Units
** Mainly used as an ornamental; heat levels not measured.

type selections began in 1894 when Dr. Garcia began improving the local chiles grown by Hispanic gardeners around Las Cruces, New Mexico. Today, the New Mexican pod type is often mistakenly called ‘Anaheim’. Chiles such as ‘NuMex Big Jim’ and ‘Anaheim’ are actually cultivars within the New Mexican pod type. ‘Anaheim’ seed originated in New Mexico and was taken to Anaheim, California, where it has remained and is widely cultivated.

Chile’s most recognizable trait is heat. Capsaicinoids, chemical compounds produced in blisters or vesicles on the fruit’s placenta, produce the heat sensation when consumed. While seeds are not the source of heat, they occasionally get splashed with the capsaicinoids because of their proximity to the placenta. The chile’s genes, weather, growing conditions, and fruit age affect capsaicinoid content and, thus, the heat level. Plant breeders selectively develop cultivars with varying degrees of heat. Growers also subject their plants to different amounts of stress, producing hotter pods. Consequently, the chile heat levels listed in Table 1 are averages that can vary by year and growing location.

This publication describes cultivars released from NMSU since 1913. New Mexico’s chile growers plant most of their chile acreage to cultivars developed at NMSU or to cultivars that have NMSU cultivars in their pedigrees. Seed for the NMSU cultivars is available from the Chile Pepper Institute (http://cpi.nmsu.edu).

CULTIVAR DESCRIPTIONS

New Mexico No. 9
Before Dr. Garcia developed the New Mexican pod type, there was no control over the genetic constitution of the chile seeds planted, and farmers could never predict the size or heat of the pods. Dr. Garcia thought that if he made the chiles milder and more uniform, consumption would increase among the non-Hispanic population. He had two colors of chile to choose from: red (Colorado) or black (negro). He chose the red strain. This was fortuitous for New Mexico because, 100 years later, chile (paprika) used as a red coloring agent has become an important part of the New Mexico chile industry. He improved native chile by hybridization and selection. His goal was to produce a chile cultivar that was “larger, smoother, flesher, more tapering and included a shoulder-less pod for canning purposes” (Garcia, 1921). He selected 14 chile accessions growing in the Las Cruces area from three types: pasilla (dark brown), Colorado (red), and negro (dark brown) chiles.

After nine years of testing, ‘New Mexico No. 9’ was deemed the most successful, and Dr. Garcia wrote that it had “proven to be the best.” He said, “While ‘New Mexico No. 9’ is not quite as hot as most of the unimproved varieties, it seems to be hot enough. Most of the plants produce pods having the characteristics desired, but there are always some plants in the field which tend to revert back and, consequently, it is necessary to select the seed in the field.” Heat of ‘New Mexico No. 9’ is estimated to have been in the range of 1,000 to 1,500 Scoville Heat Units (SHU) because it was reported to be twice as hot as ‘New Mexico No. 6’ (Harper, 1950). Dr. Garcia did not realize that his chile lines were cross-pollinating and causing new variability. In retrospect, it was serendipitous that he picked the pasilla, Colorado, and negro types. They probably intercrossed and produced progeny that contained novel gene combinations, allowing him to select for the new pod type and cultivar.

Dr. Garcia also said, “No special effort [has been] made to produce a blight [chile wilt] resistant strain at this time. Naturally in the work of rouging and selection, incidentally
the hardier and more blight resistant plants were also selected. While this [chile] variety, at the present time, is not entirely immune to the blight, it does show that it is not so susceptible to the wilt as the unimproved varieties. It is hoped that in the near future more intensive work can be undertaken to produce and establish an absolutely blight resistant variety.” New Mexico No. 9’ had uniform heat and a standard pod size and shape (Figure 1), making it the chile standard until 1950, and helped establish the Mexican food industry in the United States.

New Mexico No. 6/
New Mexico 6-4
In 1950, Dr. Roy Harper released ‘New Mexico No. 6’ from a selection made in 1947 from an undesignated local chile (Harper, 1950). It yielded chile that was 23% drier than ‘New Mexico No. 9’. ‘New Mexico No. 6’ was particularly well suited for the processing industry and for producing green chile for the fresh market. It produced a high proportion of large, smooth, thick-fleshed pods that ranged from 6 to 8 inches in length and averaged 2 inches in width (Figure 2). The pods were long-elliptical to oblong in shape, bluntly pointed, and shorter than other New Mexican cultivars. The shoulders of the green pods were generally well-rounded and smooth. ‘New Mexico No. 6’ produced a higher proportion of well-shaped pods than ‘Anaheim’. The pods were a uniform medium green in color. The fruit had thick walls and dried more slowly than those of ‘New Mexico No. 9’. ‘New Mexico No. 6’ ranged in heat level from 700 to 900 SHU—half that of ‘New Mexico No. 9’. Under average conditions, ‘New Mexico No. 6’ plants branched lower and did not grow as tall as ‘New Mexico No. 9’.

In 1957, ‘New Mexico No. 6’ was modified, made less hot, and renamed ‘New Mexico 6-4’. It was released to a local green chile processor and is still a popular chile cultivar. ‘New Mexico 6-4’ matures earlier than ‘New Mexico No. 9’. The fruit are thick-fleshed, medium-green, very smooth with well-rounded shoulders, blunt-tipped, and suitable for canning.

Figure 2. ‘New Mexico 6-4’ pods in the green stage.
**Sandia (Sandia A)**

In 1956, Dr. Harper released what was originally called ‘Sandia A’; later, in 1967, this cultivar was changed to ‘Sandia’ by the New Mexico Crop Improvement Association. The cultivar originated from a hybridization between ‘New Mexico No. 9’ and a California Anaheim-type cultivar and matured earlier than ‘New Mexico No. 9’. ‘Sandia’ produces long, medium-wide pods with medium-thick walls. Pods are straight with a slightly roughened surface, but devoid of severe folds that were commonly present on ‘Anaheim’. ‘Sandia’ pods are slightly flattened and have the greatest width toward the stem end, its shoulders are rounded, and the pods tapered gradually to the blossom end (Figure 3). The pod’s flesh portion averages 63% of the total weight of the dry red fruit. This is similar to ‘New Mexico No. 9’ and slightly less than the average for ‘Anaheim’. Green pod yields of ‘Sandia’ average 12,207 lb/acre, with average yields 33% higher than those of ‘New Mexico No. 9’, but less than ‘New Mexico No. 6’. ‘Sandia’ plants set fruit well on the lower nodes during high temperature periods. Plants are upright in growth habit and average 24 to 30 inches in height. The cultivar is considered hot, with a heat level of 1,500–2,000 SHU, and is popular with home gardeners.

**Figure 3. 'Sandia' pods in the mature red stage.**

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**Rio Grande 21**

Dr. Harper released ‘Rio Grande 21’ in 1967 (Harper, 1967) from a hybridization between ‘New Mexico No. 6’ and ‘Anaheim’. The cultivar is similar in maturity to ‘New Mexico No. 9’, with large, smooth, green pods with thick flesh. Mature succulent pods are slightly flattened and elliptical in shape, with a slight longitudinal depression toward the blossom end (Figure 4). The stem end is cylindrical and without prominent shoulders, whereas the blossom end tapers to a medium point and does not have prominent lobes. ‘Rio Grande 21’ mature pods average 6.70 inches in length and 1.73 inches at their widest dimension. ‘Rio Grande 21’ averages 8.5 mature green and 44.3 dry red pods per pound. The fleshy, dry portion of the pod, exclusive of stem and seeds, averages 66% of the dry red fruit’s total weight—higher than the average for either ‘Anaheim’ or ‘New Mexico No. 9’. The cultivar’s green pod yield averages 15,436 lb/acre. ‘Rio Grande 21’ plants show a slight tendency for poor fruit set during extremely high temperature periods. The lower nodes on some plants can be devoid of fruit, and heavy fruit set on the upper nodes results in a spreading-type plant that is normally 24 to 32 inches in height. Today, this cultivar is not widely grown in New Mexico.

**Figure 4. ‘Rio Grande 21’ mature pods in the green and red stages.**
NuMex Big Jim

Released by Dr. Roy Nakayama in 1975, this cultivar is listed in the Guinness Book of Records as the world’s largest chile (Nakayama, 1975). The mature green fruits are long, thick, smooth, fleshy, and moderately flattened and taper to a hook at the apex (Figure 5). Mature green fruit averages 7.68 inches in length and 1.89 inches in width. It has a slightly higher heat level than ‘New Mexico 6-4’, but not as high as ‘Rio Grande 21’ and ‘Sandía’. A unique trait of ‘NuMex Big Jim’ is that heat levels vary from plant to plant, with some plants producing mild pods and others producing hot pods. In addition to its use as green chile, the fruit are adapted for dry red chile products. It is higher in extractable red color than ‘New Mexico 6-4’. Mature green fruit color ranges from light to medium green. Fruit set is more concentrated and is adapted to mechanical harvesting, with an average yield of 31,761 lb/acre for green chile. Plant height averages 16 to 26 inches. Because of the large pods, the cultivar is a favorite of home gardeners and chefs for making chile rellenos, a stuffed chile pod.

Figure 5. ‘NuMex Big Jim’ large pods in the mature green stage.

Española Improved

Dr. Frank Matta and Dr. Nakayama released ‘Española Improved’ in 1984 (Matta and Nakayama, 1984) that resulted from a hybridization between ‘Sandía’ and a northern New Mexico strain of chile. It is an early maturing red chile cultivar (155 days) adapted to the shorter growing season in north-central New Mexico. It produces long, smooth, fleshy fruit with broad shoulders tapering to a sharp point at the apex (Figure 6). This shape is common among native pod shapes in the area. The mature, dark-green fruit of ‘Española Improved’ average 6.18 inches in length and 1.23 inches wide. Relatively high green pod yields, fruit size, and marketable characteristics (long, smooth pods) make it superior to native strains for use as green chile in northern New Mexico. Fruit are smooth, well-shaped, and adapted for dry red products, with high heat levels of 1,500–2,000 SHU. It is a popular cultivar for northern New Mexico and other areas needing an early maturing cultivar.

Figure 6. Pods on the plant of ‘Española Improved’.
**NuMex R Naky**

Dr. Nakayama released this cultivar in 1985, and named it after his wife, Rose (Nakayama and Matta, 1985). In its pedigree are ‘Rio Grande 21’, ‘New Mexico 6-4’, Bulgarian paprika, and an early maturing native type. It sets fruit under high temperatures and low humidity and yields 30,930 lb/acre, significantly higher than ‘New Mexico 6-4’ (22,783 lb/acre). When red color was measured using the American Spice Trade Association (ASTA) method, it had a color rating of 188 ASTA, which was better than ‘New Mexico 6-4’ (127 ASTA). The heat level was 260–760 SHU, making it a very mild cultivar. The pod is slightly longer and wider than ‘New Mexico 6-4’ (Figure 7). ‘NuMex R Naky’ is sometimes used as a paprika cultivar in New Mexico because of its low heat level. Paprika is defined in the United States as red pepper powder with undetectable or low heat.

*Figure 7. Many stages of maturity of ‘NuMex R Naky’.*

**NuMex Sunrise, NuMex Sunset, and NuMex Eclipse**

These cultivars were released in 1988 by Dr. Paul Bosland, Dr. Jaime Iglesias, and Dr. Steve Tanksley. The cultivars were unique because they provide alternative mature fruit color in the New Mexican pod type (Bosland et al., 1990). ‘NuMex Sunrise’, ‘NuMex Sunset’, and ‘NuMex Eclipse’ have fruits that start green and then turn yellow, orange, and brown, respectively (Figure 8). They are used primarily as ornamental chiles. It has been a New Mexican tradition to harvest and string mature red chile pods into ristras that hang near the entrance of homes as symbols of hospitality and good luck. Only chile types that dehydrate sufficiently to eliminate rotting can be used to make ristras. All three cultivars originated from a hybridization between ‘Permagreen’, a green bell pepper, and ‘New Mexico 6-4’ and have a similar heat level to ‘New Mexico 6-4’.

*Figure 8. ‘NuMex Eclipse’, ‘NuMex Sunset’, and ‘NuMex Sunrise’ are used for full-size, colorful ristras.*
**NuMex Conquistador**
This cultivar, released in 1989, originated as a single-plant selection from ‘New Mexico 6-4’, which is a hot cultivar (Bosland et al., 1991). ‘NuMex Conquistador’, a no-heat cultivar, is considered to be a New Mexican-type paprika chile. High-performance liquid chromatography analysis revealed that capsaicinoid levels are less than 10 ppm, which is below the level at which humans can taste heat. The fruits have round shoulders, a pointed tip, a smooth surface, thick flesh, and two locules (cells; Figure 9). Mean fruit length is 6.18 inches and fruit weight is 2.76 ounces, and plants have a single, strong main stem with sturdy branches. Mean plant height is 29.5 inches and plant width is 25.0 inches, which is similar to that of ‘New Mexico 6-4’ and ‘NuMex R Naky’. This cultivar is used as a paprika cultivar in the mature red stage; in the green stage, it is stuffed with jalapeño-flavored cheese to produce chile rellenos with uniform heat levels.

**Figure 9. ‘NuMex Conquistador’ green and red pods.**

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**NuMex Sweet**
A paprika-type or low-heat chile that was released in 1990, ‘NuMex Sweet’ originated as a single-plant selection from a field planted to an open-pollinated population of ‘New Mexico 6-4’, a hot New Mexican-type chile cultivar (Bosland et al., 1993b). A single plant was increased in the greenhouse after three generations of selfing and tested two years in field trials. This cultivar incorporates the plant and fruit characteristics, determined by the paprika processors, as an ideal paprika-type chile. ‘NuMex Sweet’ is a low-heat New Mexican-type chile with round shoulders, a pointed tip, smooth fruits, two locules, and a high color rating (157 ASTA; Figure 10). It exhibits less variability for horticultural traits than ‘New Mexico 6-4’ or ‘NuMex R Naky’. The plant has a single, strong main stem and sturdy branches that provide foliage cover for sunscald protection and support for an excellent fruit set. Plant height and plant width of 24 and 30 inches, respectively, are similar to ‘NuMex Conquistador’ and ‘NuMex R Naky’. Fruit thickness of ‘NuMex Sweet’ is less than ‘NuMex Conquistador’ or ‘NuMex R Naky’, allowing for greater “dry down” in the field. The heat level of ‘NuMex Sweet’ is 200–300 SHU. The most remarkable characteristic of ‘NuMex Sweet’ is the outstanding yield of a single harvest of dry red at 7,781 lb/acre. This yield is 40% greater than ‘NuMex R Naky’, a standard New Mexico paprika cultivar.

**Figure 10. ‘NuMex Sweet’ paprika-type pods.**
**NuMex Joe E. Parker**

This cultivar was named in honor of Mr. Joe E. Parker of Las Cruces, New Mexico, a 1950 graduate of NMSU’s College of Agriculture and Home Economics (Bosland et al., 1993a). Mr. Parker assisted in evaluating this specific selection. ‘NuMex Joe E. Parker’, released in 1990, originated as a single-plant selection from a field planted to an open-pollinated population of ‘New Mexico 6-4’, and is recommended for green and red chile production in southern New Mexico (Figure 11). This cultivar exhibits less variability for horticultural traits than ‘New Mexico 6-4’, the standard chile cultivar for southern New Mexico. ‘NuMex Joe E. Parker’ plants have single, strong main stems and are uniformly branched, providing foliage cover for sun-scald protection and support for an excellent fruit set. ‘NuMex Joe E. Parker’ has a plant height between 24 and 30 inches, and there are no significant differences between ‘New Mexico 6-4’ and ‘NuMex Joe E. Parker’ for heat levels, fruit width, green fruit color, or days to maturity (149 days). The major features of this cultivar are green and red chile yield, fruit wall thickness, and red chile yield after a harvest of green fruit, which are all better than ‘New Mexico 6-4’. The increased fruit set after the first green harvest results in a high “red after green” dry fruit yield that gives the grower the choice of either continuous picking of a green crop or a green chile harvest followed by a later red fruit harvest. After peeling, a thicker fruit wall produces a higher “pack-out” yield of green chile than thin-walled fruits. ‘NuMex Joe E. Parker’ has a high percentage (88%) of two-locule fruit, a desirable characteristic for canning whole pods. A 122 ASTA red color is similar to that of ‘New Mexico 6-4’. ‘NuMex Joe E. Parker’ has very high levels of vitamin C in the green mature stage and is resistant to tobacco mosaic virus (TMV). Its heat levels are in the mild range at around 800 SHU.

![Figure 11. ‘NuMex Joe E. Parker’, a very popular green chile variety.](image-url)
**NuMex Garnet**

‘NuMex Garnet’ was released in 2004 as an open-pollinated paprika-type chile with high extractable color (303 ASTA), and at 157 SHU it is considered a very mild chile pepper (Walker et al., 2004). ‘NuMex Garnet’ originated from a hybridization between ‘B-18’ and a New Mexican-type cultivar. ‘NuMex Garnet’ was selected for its compact growth habit, high yields, high extractable color, high dry matter in fruit, and low heat levels. It is predominantly suited for use as a natural red colorant in the form of powder or oleoresin. The fruit are not as wide as but are longer than ‘B-18’, while the fruit wall thickness is the same as ‘B-18’ and ‘NuMex Conquistador’. Fruit width is 1.5 inches and fruit length is 6.2 inches, and wall thickness measures about 0.25 inch (Figure 12). ‘NuMex Garnet’ is an excellent candidate for machine harvesting because of the ease of stem detachment and fruit dispersal on the plant.

*Figure 12. ‘NuMex Garnet’ dried paprika pod.*

**NuMex Heritage Big Jim**

Original seed of ‘NuMex Big Jim’ was obtained from the National Laboratory for Genetic Resource Preservation in Fort Collins, Colorado, with a goal of developing a more uniform, thick-walled chile with a consistent heat level. Members of the New Mexico Chile Commission made selections from 40 breeding lines of the original ‘NuMex Big Jim’. A total of six of the best-performing lines were chosen and re-tested. Selections were made based on the most important horticultural characteristics that were important to the New Mexico chile industry, including high yield, uniform heat level, improved fruit qualities, easy de-stemming, and, most importantly, a traditional flavor. ‘NuMex Heritage Big Jim’ has large, flattened, thick-walled mature green fruit with round shoulders (Figure 13); has a heat level between 7,000 and 9,000 SHU; and is more consistent than ‘NuMex Big Jim’.

*Figure 13. ‘NuMex Heritage Big Jim’, an improved and more flavorful Big Jim variety.*
**NuMex Heritage 6-4**

In 2002, original seed of ‘New Mexico 6-4’ was obtained from the National Laboratory for Genetic Resource Preservation in Fort Collins, Colorado, to develop a genetically superior chile variety that would help New Mexico growers compete in the global market as well as capture the original flavor of ‘New Mexico 6-4’. Similar to the development of ‘NuMex Heritage Big Jim’, New Mexico Chile Commission members made selections from 27 breeding lines of the original ‘New Mexico 6-4’, and six of the best-performing lines were chosen and retested. Selections were made based on the most important horticultural characteristics that were important to the New Mexico chile industry, including high yield, uniform heat level, improved fruit qualities, easy de-stemming, and, most importantly, a traditional flavor. ‘NuMex Heritage 6-4’ is recognized for producing pods with smooth, thick flesh ranging from 6–8 inches in length (Bosland, 2012), with a heat level of 1,500 SHU and yields higher than the original ‘New Mexico 6-4’ (Figure 14).

**Figure 14.** ‘NuMex Heritage 6-4’, an improved and more flavorful variety.

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**NuMex Sandia Select**

New Mexico green chile growers and processors approached the NMSU chile breeding program and requested an improved ‘Sandia’ that had a thicker-walled green pod with a relatively high heat level and increased yield. The result was ‘NuMex Sandia Select’. The plants have a single, strong main stem and are uniformly branching, providing foliage cover for sunscald protection and support for an excellent fruit set, but there is no difference in plant height when compared to ‘Sandia’ (Bosland and Coon, 2014). ‘NuMex Sandia Select’ has significantly greater yield—up to 40% higher—than the original ‘Sandia’. ‘NuMex Sandia Select’ produced green mature pods with a smooth, thick wall that are longer in length than the original ‘Sandia’ (Figure 15). The calyx is easily removed by hand, and the heat level, an important quality trait, was measured to be 9,500 SHU, proving to be a hot cultivar in the New Mexican pod type, just like the original ‘Sandia’.

**Figure 15.** ‘NuMex Sandia Select’, an improved variety with a thicker flesh than ‘Sandia’.
**NuMex R. Vince Hernandez**

‘NuMex R. Vince Hernandez’ originated from a hybridization between two breeding lines, 189W05 and 25W05. The breeding line 189W05 was developed from a hybridization of ‘Sonora’, an open-pollinated cultivar commonly grown for paprika processing in 2005, and an unidentified chile pepper line sourced from Zimbabwe. ‘NuMex R. Vince Hernandez’ provides significantly greater dry red yield compared to ‘LB-25’, and exhibits improved drying efficiency in furrow-irrigated plots (Walker, 2015). Heat level is not significantly different from ‘LB-25’, and the average heat level for ‘NuMex R. Vince Hernandez’ is less than the maximum of 700 SHU accepted by the chile industry for a paprika-type chile pepper. The average extractable pigment for ‘NuMex R. Vince Hernandez’ is 250 ASTA (Figure 16). Favorable flavor is reported for ‘NuMex R. Vince Hernandez’ and was determined by taste tests of the fresh fruit and ground powder by knowledgeable program personnel and visiting New Mexico Chile Commissioners.

**NuMex Vaquero**

‘NuMex Vaquero’ is an open-pollinated jalapeño that yields very well in southern New Mexico. Released in 1997 by Dr. Bosland and Dr. Eric Votava, ‘NuMex Vaquero’ has in its pedigree Early Jalapeno, ‘TAM Jalapeno’, and Criollo de Morelos 334. Criollo de Morelos 334 is a Phytophthora blight-resistant accession. ‘NuMex Vaquero’ pods are 2.5 inches long, which is similar to ‘Mitla’ and ‘TAM Jalapeno’, and almost 1 inch wide. It has smooth skin (no corkiness), a blunted tip, rounded shoulders, and multiple locules and is green without purpling (Figure 17). It has uniform heat levels of 25,000–30,000 SHU, similar to Early Jalapeno, and has good jalapeño flavor with sweet walls. At the third node, the plants are about 6 inches tall and 19 inches wide. Yield averaged 24,000 lb/acre, the same as the F₁ hybrid jalapeño ‘Mitla’. A striking feature of ‘NuMex Vaquero’ is its resistance to Phytophthora blight; it was tested for resistance to both foliar blight and root rot, and the tests indicated that ‘NuMex Vaquero’ possessed resistance to Phytophthora root rot races 2 and 3 and Phytophthora foliar blight race 2.
NuMex Piñata
Released in 1998, the jalapeño cultivar ‘NuMex Piñata’ originated spontaneously in the cultivar Early Jalapeno (Votava and Boslard, 1998). ‘NuMex Piñata’ is unique in the transition of colors the fruit undergo as they mature. Immature fruit are light green and mature to yellow, orange, and finally red (Figure 18). The fruit color of standard jalapeño cultivars changes from green to red. The foliage of Early Jalapeno and other jalapeño cultivars is dark green, while ‘NuMex Piñata’ has greenish-yellow foliage. The inheritance of the foliage color and fruit color transition phenotype of ‘NuMex Piñata’ is due to a single homozygous recessive gene (Votava et al., 2000). The plant growth habit of ‘NuMex Piñata’ is smaller and tends to decline earlier in the season due to the lack of chlorophyll produced by the foliage. ‘NuMex Piñata’ is a unique jalapeño for making colorful salsa because it keeps the natural flavors and aromas of traditional jalapeños and is considered hot with a heat level of 50,000 SHU. All plant and fruit characteristics, including plant height, yield, and pod width, are not significantly different from Early Jalapeno. One difference is pod length, which was longer than Early Jalapeno.

NuMex Primavera
‘NuMex Primavera’ is an open-pollinated jalapeño cultivar that was developed using a pedigree breeding method that included several generations of hybridizations, selfing, and repeated single-plant selection (Boslard and Votava, 1998). During each generation, selections were made based on the horticultural characteristics deemed important to the production and processing industries: easy calyx detachment, dark green color with the absence of anthocyanin, little to no corkiness, and multiple locules. The fruit have rounded shoulders and a semi-pointed tip that are characteristic of the standard jalapeño shape (Figure 19). ‘NuMex Primavera’ displays a uniformly mild heat level at 8,500–9,000 SHU, much milder than industry standard jalapeños. ‘NuMex Primavera’ fruits are 2 inches in length and 1 inch wide, with a wall thickness less than 0.25 inch. Plant height is 6.5 inches and plant width is 15 inches, and yields are 16,591 lb/acre in the field. ‘NuMex Primavera’ is a favorite of home gardeners because of its mild heat combined with traditional flavors and aromas.
NuMex Jalmundo

‘NuMex Jalmundo’ originated from a hybridization between a bell pepper, ‘Keystone Resistant Giant’, and Early Jalapeno. ‘NuMex Jalmundo’ is a jumbo-type jalapeño pepper perfect for poppers (Figure 20), but it also has a fair amount of heat. ‘NuMex Jalmundo’ produces excellent yields, with pods that are 3.7 inches long and 1.4 inches wide. The pods mature from green to red. ‘NuMex Jalmundo’ has a per-pod weight greater than Early Jalapeno, but equal to the F₁ hybrid ‘Grande’. The yield of 6.76 metric tons/hectare of the open-pollinated cultivar ‘NuMex Jalmundo’ was equal to that of ‘Grande’. ‘NuMex Jalmundo’ is considered medium heat level at 17,000 SHU on a dry weight basis.

Figure 20. ‘NuMex Jalmundo’, a jumbo jalapeño with high yields.

NuMex Orange Spice, NuMex Pumpkin Spice, and NuMex Lemon Spice

Colorful vegetables provide high-value products to a growing market of upscale consumers, and in turn furnish opportunities for small-scale farmers to make a transition from traditional production of low-value commodities toward the production of produce with greater value. ‘NuMex Lemon Spice’, ‘NuMex Orange Spice’, and ‘NuMex Pumpkin Spice’ originated from hybridization between ‘Permagreen’ bell pepper and Early Jalapeno in 1995 (Bosland and Coon, 2015a; Figure 21). The average fruit wall thickness and pod width of each cultivar is not significantly different from Early Jalapeno. ‘NuMex Orange Spice’ and ‘NuMex Pumpkin Spice’ have significantly longer pods than Early Jalapeno, while ‘NuMex Lemon Spice’ is not significantly different from Early Jalapeno. ‘NuMex Orange Spice’, or ‘NuMex Pumpkin Spice’, ‘NuMex Orange Spice’ fruit have epidermal reticulation, or “corkiness,” which is similar to Early Jalapeno fruit, while ‘NuMex Lemon Spice’ and ‘NuMex Pumpkin Spice’ lack the epidermal reticulation. ‘NuMex Lemon Spice’ and ‘NuMex Pumpkin Spice’ have heat levels of 25,000 SHU, which is similar to Early Jalapeno. ‘NuMex Orange Spice’ is significantly hotter, with an average heat level of 79,000 SHU.

Figure 21. ‘NuMex Orange Spice’, ‘NuMex Pumpkin Spice’, and ‘NuMex Lemon Spice’, a trio of different-colored jalapeños.
NuMex Sunburst, NuMex Sunflare, and NuMex Sunglo

These cultivars have an immature fruit color of green, while mature fruit color is orange, red, and yellow, respectively, for ‘NuMex Sunburst’, ‘NuMex Sunflare’, and ‘NuMex Sunglo’ (Figure 22). They are used for the popular “mini ristras” of the Southwest. A mini ristra is made of chiles that are smaller than the usual New Mexican-type chile pod; they are popular as tourist items because they are easier to transport than traditional New Mexican-type ristras. They were derived by pedigree breeding from a seed sourced from India and released in 1991 (Bosland, 1992a). Individual plants were self-pollinated in the greenhouse for five generations, and then grown and evaluated in the field for two years. They were selected for traits deemed essential for ristra use, including, but not limited to, mature fruit color, non-corkiness, pointed tip, round shoulder, attached calyx, appropriate fruit length and width, and a compact plant habit. The fruits dry down on the plant under the environmental conditions of southern New Mexico. The plants have an upright, semi-determinate, non-spreading growth habit. The fruits are pendulate, and leaves are sufficiently dense on the plant to prevent sunscald to the pods. ‘NuMex Sunglo’, ‘NuMex Sunflare’, and ‘NuMex Sunburst’ have pod lengths of 3.26, 2.87, and 2.78 inches, respectively, while pod widths are 0.54, 0.40, and 0.50 inch, respectively. The fruit sizes are in the range of the chile types known as de Arbol chiles. All three cultivars are hot; however, the heat level has not been measured.

Figure 22. ‘NuMex Sunburst’, ‘NuMex Sunglo’, and ‘NuMex Sunflare’, colorful de Arbol chiles used for mini ristras.

NuMex Bailey Piquin

This cultivar, released in 1991, was named in honor of Mr. Alton L. Bailey, NMSU Extension Vegetable Specialist Emeritus, who helped evaluate this selection (Bosland and Iglesias, 1992). This machine-harvestable chile piquin originated as a single-plant selection from an open-pollinated accession collected in the Caribbean area of Mexico. It has an upright, semi-determinant, non-spreading growth habit, and produces fruits that are upright and set high on the plant canopy. ‘NuMex Bailey Piquin’ is the first machine-harvestable piquin. It is homozygous for the deciduous fruit characteristic, allowing fruit separation from the calyx at maturity (Figure 23). This trait allows the fruit to be shaken from the plant by a machine. A one-row harvester was developed to harvest this cultivar. It shakes the plant, and an attached conveyor belt carries the fruits to the rear of the machine for collection. Dried fruit powder has a heat level of around 97,000 SHU. In trials at Las Cruces, dry fruit yield averaged 3,984 lb/acre.

Figure 23. ‘NuMex Bailey Piquin’ pods displayed in a bowl.
**NuMex Centennial**

‘NuMex Centennial’ was released in 1988 to celebrate NMSU’s centennial celebration, and is the first ornamental chile released from NMSU meant to be grown in small containers (Bosland et al., 1994). Many seed companies offer seeds of this cultivar, but under different names. The semi-compact plant was developed for the commercial greenhouse industry, but it is suitable for cultivation in a formal garden bed. ‘NuMex Centennial’ has purple flowers and purpling in the foliage. The fruit are purple, then ripen to yellow, orange, and finally red (Figure 24). It was selected from a seed accession acquired from Chihuahua, Mexico.

**Figure 24.** ‘NuMex Centennial’, an ornamental variety developed for NMSU’s 100-year anniversary.

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**NuMex Twilight**

This ornamental chile has fruit color that ripens from purple to yellow to orange and, lastly, red (Bosland et al., 1994; Figure 25). The various fruit colors enhance their value as commercial greenhouse potted plants, and ‘NuMex Twilight’ is well accepted by the potted plant industry. Organic Gardening has named this chile “a must have plant” because standard chile cultivars have a dichotomous growth pattern, while the polychotomous branching of the basal branches of ‘NuMex Twilight’ makes these ideal for container production. The semi-compact plants are developed for growing in small containers, but are suitable for cultivation in a formal garden bed. ‘NuMex Twilight’ has white flowers and green leaves as compared to ‘NuMex Centennial’, which has purple flowers and purple foliage. Also, the yellow fruit color stage is more pronounced in ‘NuMex Twilight’. This cultivar has erect flower pedicels at anthesis, and fruits are upright and smooth with a cup-shaped calyx. Flowers begin to open at 120 days after sowing, and fruits mature to red in an additional 96 days. The plants grow erect and have stems with no pubescence and a smooth leaf texture. Heat level and flavor have not been evaluated. Seed of ‘NuMex Twilight’ was originally from Jalisco, Mexico. The cultivar was derived from selections within the original population. ‘NuMex Centennial’ and ‘NuMex Twilight’ have been grown commercially in New Mexico as potted plants. ‘NuMex Twilight’ has also become an important source of cucumber mosaic virus (CMV) resistance for plant breeders.

**Figure 25.** ‘NuMex Twilight’, an ornamental variety that has become one of the most popular ornamental peppers for home gardeners and botanical gardens worldwide.
**NMSU HOLIDAY ORNAMENTALS:**

NuMex April Fool’s Day, NuMex Chinese New Year, NuMex Christmas, NuMex Cinco de Mayo, NuMex Columbus Day, NuMex Earth Day, NuMex Easter, NuMex Halloween, NuMex Memorial Day, NuMex St. Patrick’s Day, NuMex Thanksgiving, NuMex Summer Solstice, NuMex Thanksgiving, NuMex Valentine’s Day, and NuMex Veterans Day

The NMSU Holiday Ornamental cultivars were developed for the potted plant and nursery industries (Figure 26). Plants were selected for horticultural characteristics that included a fuller yet compact plant growth habit, upright fruit that spread over the top of the plant, heavy fruit set, the ability to be successfully grown in pots, attractive foliage, and speedy germination (Coon et al., 2017). ‘NuMex Memorial Day’ and ‘NuMex Thanksgiving’ originated from the hybridization of ‘Ivory’ by a dwarf plant in 1991. Single-plant selections were made in the F₂ generation, and then seven generations of selfing of single-plant selections were made for each. ‘NuMex Valentine’s Day’, ‘NuMex St. Patrick’s Day’, ‘NuMex Halloween’, and ‘NuMex Christmas’ are from the hybridization of ‘Black Prince’ by ‘NuMex Thanksgiving’ in 1995. Single-plant selections were made in the F₂ generation, and five generations of selfing and subsequent single-plant selections were made. Color transitions and pod shapes are ivory to red with bullet-shaped pods for ‘NuMex Valentine’s Day’, light green to orange with more rounded pods for ‘NuMex St. Patrick’s Day’, ivory to lemon yellow with round pods for ‘NuMex Memorial Day’, black to orange with bullet-shaped pods for ‘NuMex Valentine’s Day’, ivory to orange with bullet-shaped pods for ‘NuMex Christmas’, and dark green to red with bullet-shaped pods for ‘NuMex Christmas’. ‘NuMex April Fool’s Day’ and ‘NuMex Cinco de Mayo’ are both semi-dwarf ornamental plants with upright, de Arbol-like pods. ‘NuMex April Fool’s Day’ starts purple and turns to red, while ‘NuMex Cinco de Mayo’ starts yellow, turns to orange, and matures to red. ‘NuMex Easter’ is a fasciculated semi-dwarf ornamental chile pepper with bullet-shaped pods that turn from pastel purple to yellow and mature to orange. ‘NuMex Chinese New Year’ is a fasciculated dwarf plant that has clusters of upright pods that turn from lime green to red. ‘NuMex Veterans Day’ is a dwarf plant that has upright pods that change from purple to burnt orange. ‘NuMex Earth Day’ is a dwarf plant that has upright pods that change from green to brown. ‘NuMex Summer Solstice’ is a dwarf plant that has upright pods that change from ivory to pale salmon. ‘NuMex Columbus Day’ is a dwarf plant that has upright pods that change from green to orange-red.


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NuMex Nematador
This cultivar got its name from the Spanish *mira sol*, which means “looking at the sun,” because the fruit are erect and point upward. ‘NuMex Mirasol’ was developed over six years using a pedigree breeding method that included hybridization and repeated single-plant selections, and was released by Dr. Bosland and Dr. Max Gonzalez in 1994. It originated from a hybridization between ‘La Blanca’ and ‘Santaka’. Selection was carried out for upright fruit, fruit size and color, the number of fruit per cluster, and the number of clusters per plant. At maturity, it is a multi-stemmed bush, 23.8 inches tall and 15.3 inches wide. The fruit are green when immature and turn red at maturity (Figure 27). The fruit are hot. Each plant produced an average of 16 fruit clusters per plant, with 4 fruits per cluster. Fruits are 2.17 inches long and 0.75 inch wide. The fruits are conic shaped and have two locules. ‘NuMex Mirasol’ is used both as an ornamental on wreaths and as a floral type, and the red fruit are ground into powder for use in cooking.

Figure 27. ‘NuMex Mirasol’, a variety used in ornamental wreaths and ristras.

NuMex Nematador
‘NuMex Nematador’ is an open-pollinated, nematode-resistant cayenne-type chile that was released in 2003 (Bosland et al., 2003). Cayenne production in New Mexico was valued in excess of $4.7 million at farm-gate because of the demand for cayenne mash, the core ingredient in hot sauce. ‘NuMex Nematador’ is adapted to southern New Mexico growing conditions and provides resistance to the southern root knot nematode, a major pest for cayenne producers. ‘NuMex Nematador’ was developed from the cultivar ‘Large Red Thick’ and was evaluated for yield, heat level, desirable fruit characteristics, plant growth habits, and level of nematode resistance (Figure 28). ‘NuMex Nematador’ took an average of 99 days to first harvest from time of transplanting. Average fruit width was 0.6 inch, fruit length was 5.8 inches, and heat level rated at 15,000 SHU.

Figure 28. ‘NuMex Nematador’, an improved and nematode-resistant cayenne variety.
**NuMex Las Cruces**

‘NuMex Las Cruces’ is a high-yielding, high-heat cayenne pepper with a maturity similar to that of ‘Large Red Thick’, an early maturing cayenne cultivar. In replicated trials in 2005–2007, ‘NuMex Las Cruces’ fruit length (6.7 inches) was not significantly different from ‘Large Red Thick’ and ‘Mesilla’. Fruit width of ‘NuMex Las Cruces’ is most similar to ‘Mesilla’ (1 inch), and both are wider than ‘Large Red Thick’. Individual pod weight for ‘NuMex Las Cruces’ (1 ounce) is between ‘Large Red Thick’ and ‘Mesilla’. Hand removal of the pedicel and calyx was rated “easy,” and ripe mature pod color of ‘NuMex Las Cruces’ was scarlet (Figure 29). The heat level of ‘NuMex Las Cruces’ was determined at 17,400 SHU, which is significantly hotter than ‘Large Red Thick’ (12,900 SHU) or ‘Mesilla’ (13,200 SHU); it is therefore well-suited for the cayenne mash industry for hot sauce production. The average yield over a 3-year period was 50% higher than ‘Large Red Thick’, the standard open-pollinated cultivar grown in the southern New Mexico production area. ‘NuMex Las Cruces’ yielded as well as the high-yielding F<sub>1</sub> hybrid ‘Mesilla’. ‘NuMex Las Cruces’ has also shown high resistance to the beet curly top virus year after year while in production.

**NuMex Suave Red and NuMex Suave Orange**

‘NuMex Suave Red’ and ‘NuMex Suave Orange’, released in 2004, originated from a habanero pod-type seed lot that was acquired by the NMSU Chile Breeding and Genetics Program from W.D. Adams, who commented on their mild nature (Votava and Bosland, 2004). He received seed from an anonymous individual who called the seeds aji red and aji yellow. The exact origins of these two accessions are unknown; however, they exhibit phenotypic similarities to other *Capsicum chinense* pod types (Figure 30). Based on the large size of the fruits, these cultivars must have originated from local or landrace varieties. Replicated field plot trials were performed in 2002 and compared to other habanero-type cultivars. ‘NuMex Suave Red’ and ‘NuMex Suave Orange’ are significantly milder than any other cultivar of *C. chinense*, with heat levels of 774 and 335 SHU, respectively. Fruit characteristics are similar to other habanero cultivars, including fruit weight, length, and width; plant heights and widths are much taller and wider than other habanero cultivars.

![Figure 29. ‘NuMex Las Cruces’, an improved, high-yielding cayenne variety.](image1)

![Figure 30. ‘NuMex Suave Red’ and ‘NuMex Suave Orange’, the first mild habanero varieties on the market.](image2)
**NuMex Trick-or-Treat**

‘NuMex Trick-or-Treat’ originated from the hybridization between ‘Orange Habanero’ and a no-heat C. chinense accession from Colombia (Bosland and Coon, 2015b). The accession from Colombia matures to a red color and has a lantern-shaped pod reminiscent of ‘Orange Habanero’. A pedigree breeding method that included a backcross to ‘Orange Habanero’ and four generations of single-plant selection from subsequent generations was accomplished in a greenhouse. In replicated trials, ‘NuMex Trick-or-Treat’ did not differ significantly from ‘Orange Habanero’ in plant height or plant width. The yield of ‘NuMex Trick-or-Treat’ averages 6,940 lb/acre and is not significantly different from ‘Orange Habanero’ (6,872 lb/acre). Small differences in fruit width, fruit length, and wall thickness are observed between ‘NuMex Trick-or-Treat’ and ‘Orange Habanero’. The pods of both cultivars mature to similar orange colors (Figure 31). No discernible heat was detected in ‘NuMex Trick-or-Treat’ by the organoleptic test or by the high-performance liquid chromatography method. The average heat level for ‘Orange Habanero’ is 300,000 SHU on a dry weight basis. The flavor and aroma of ‘NuMex Trick-or-Treat’ are equal to, or better than, ‘Orange Habanero’.

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